on the type of the silico-tungstic acids obtained by Marignac. The new series of salts contain platinum instead of silicon, and the salt $10WO_3PtO_24Na_2O + 25\ H_2O$ has been obtained by boiling platinic hydrate $Pt(OH)_4$ with acid sodic tungstate. Two metameric sodium salts have been obtained, one of an olive-green colour, the other honey yellow with an adamantine lustre. The corresponding potassium and ammonium salts of this platino-tungstic acid have also been obtained, but they belong to the yellow series. Mr. Gibbs has not as yet obtained salts corresponding to Marignac's twelve atom silico-tungstates. Acid molybdate of sodium also dissolves $Pt(OH)_4$, giving a green solution, which appears red when viewed in thick layers; the only salt of this series studied, crystallises in amber tabular plates having the composition $10MO_3PtO_24Na_2O + 25H_2O$. He is endeavouring to generalise the results by substituting other hydrates, such as $Zn(OH)_4$, $Ti(OH)_4$, $Sn(OH)_4$, but has, as yet, in these cases not obtained very definite results. He is also engaged in examining the phospho-tungstic acids containing $20WO_3$ obtained some time ago by Scheibler.

A SUPPOSED NEW METAL "DAVIUM."—The discovery of this new element is reported from St. Petersburg by Serjius Kern. It was found by him in the residues of platinum ores after treatment to separate out the metals of the platinum group. The specific gravity of the metal is given as 9·385 at 25°. The author supposes this new metal to occupy an intermediate position between molybdenum and ruthenium, but very strong evidence will be necessary to confirm the existence of a new metal belonging to the platinum group.

EFFECT OF PRESSURE ON CHEMICAL ACTION.—M. Berthelot, in a recent number of the *Bull. Soc. Chem.*, calls attention to the fact that some experiments lately made by Quincke have confirmed a statement made by the former chemist some time ago, that the evolution of hydrogen from zinc and sulphuric acid is not arrested by pressure. The experiments of Quincke show that when these bodies are brought in contact, the pressure of the hydrogen evolved rose in a few days from 1·5 to 10 atmospheres, and in a very much longer time from 25 to 126 atmospheres. Berthelot thinks that these experiments, although not performed for this purpose, prove that chemism is not modified, but only the nature and extent of the surfaces attacked. The evolution of gas would thus go on indefinitely, not arrested, but only modified in rapidity.

AMOUNT OF OXYGEN CONTAINED IN SEA-WATER AT DIFFERENT DEPTHS.—At a recent meeting of the Royal Society of Edinburgh Mr. J. Y. Buchanan communicated some results obtained from his experiments on the above subject during the cruise of the *Challenger*. Mr. Buchanan finds that at the surface the amount of oxygen varies between 33 and 35 per cent., the higher numbers having been observed in a water collected almost on the Antarctic circle; the smallest percentages have been observed in the trade-wind districts. In bottom waters the absolute amount is greatest in Antarctic regions, diminishing generally towards the north. The oxygen percentage is greatest over "diatomaceous oozes," and least over red clays containing peroxide of manganese; over "blue muds" it is greater than over "globigerina oozes." In intermediate waters the remarkable fact was observed that the oxygen diminishes down to a depth of 300 fathoms, at which point it attains a minimum, after which the amount increases. The following figures show the nature of this phenomenon:—

Depth (fathoms)	0	25	50	100	200	300	400	800	Between 800 and the bottom.
Oxygen (O + N = 100)	33·7	33·4	32·3	30·2	33·4	11·4	15·5	22·6	23·5

It is evident from these figures that between 200 and 400 fathoms there is a great consumption of oxygen going on, and, as it is difficult to conceive its being consumed otherwise than by living creatures, the conclusion may be drawn that animal life must be particularly abundant and active at this depth, or at least more abundant than at greater depths; for, at less depths, there is more opportunity of renewal of the oxygen by reason both of the greater proximity to the surface and of the existence of vegetable life. This conclusion is borne out by the experiments of Mr. Murray with the tow-net at intermediate depths, which go to prove the existence of abundance of animal life down to 400 fathoms, vegetable life never extending much below 100 fathoms. Below 400 fathoms life is sparingly met with.

OUR ASTRONOMICAL COLUMN

THE TOTAL SOLAR ECLIPSE OF 1605, OCTOBER 12.—It is known that Clavius attributed the ring of light which he observed round the moon during the eclipse of April 9, 1567, about the time of greatest obscuration at Rome, to the circumstance of the sun's disc not being entirely covered by our satellite, a narrow rim of light thereby remaining visible. As Prof. Grant relates, in his "History of Physical Astronomy," Kepler maintained that the luminous ring seen by Clavius could not have been the margin of the solar disc, because he found by calculation that the moon was at her mean distance from the earth, when her apparent diameter exceeds that of the sun, even in perigee; and when a similar ring of light was remarked round the moon during the eclipse of February 25, 1598, and attributed to the same circumstance, Kepler again pointed out that such an explanation was inadmissible, the moon's apparent diameter, on this occasion also, exceeding that of the sun. These opinions were expressed by Kepler in his work "Ad Vitellionem Paralipomena," published in 1604, and Prof. Grant remarks that an eclipse in the following year strikingly confirmed them. This refers to the eclipse of October 12, 1605, observed at Naples, of which Kepler writes thus: (*De Stella Nova in pede Serpentarii*, p. 116) "the whole body of the sun was effectually covered for a short time. The surface of the moon appeared quite black, but around it there shone a brilliant light of a reddish hue, and uniform breadth, which occupied a considerable part of the heavens." We follow Prof. Grant's translation of this passage, which clearly proves that the eclipse was total for a brief interval at Naples.

As the eclipse of 1605 first confirmed the accuracy of Kepler's views, in opposition to those of Tycho Brahé, who disputed the possibility of a total eclipse of the sun, it may not be without interest to examine the circumstances of the phenomenon as it would be observed at Naples. For this purpose the same system of calculation adopted for other eclipses mentioned in this column, is followed. The elements are:—

G.M.T. of Conjunction in R.A. 1605, Oct. 12, at 0h. 31m. 44s.

	° ′ ″
R.A.	197 14 51·0
Moon's hourly motion in R.A. ...	35 37·1
Sun's ,, ,, ,, ...	2 19·1
Moon's declination	6 40 27·9 S.
Sun's ,, ...	7 31 32·5 S.
Moon's hourly motion in decl. ...	10 50·2 S.
Sun's ,, ,, ,, ...	0 56·4 S.
Moon's horizontal parallax	59 21·2
Sun's ,, ,, ...	8·9
Moon's true semi-diameter	16 10·4
Sun's ,, ,, ...	16 3·9

The eclipse would therefore be central with the sun on the meridian in long. 11° 18′ W. and lat. 52° 26′ N., and the following would also be points upon the central line:—

Long. 19° 9′ E., lat. 39° 32′; and long. 14° 23′ E., lat. 40° 48′.

Calculating directly for Naples we find :—

		h.	m.	s.	
Totality began October 12 at		2	18	18	} Mean time at
,, ended	,, ,,	2	19	28	} Naples.

The duration of the total eclipse was 1m. 10s., which is in satisfactory agreement with the words of Kepler. The sun was at an altitude of 31°.

THE BINARY STAR *a* CENTAURI.—As far as can be judged from a projection of the measures published to the present time, it appears probable that the nearest real approach of the components in this binary is already passed, but that they will continue to apparently close-in until the angle is somewhere about 110°, when their distance may have diminished to $1\frac{3}{4}''$. We can only continue to urge upon southern observers the great importance of frequent measures of this object for some years to come, with all the precision that the case will admit of, that a problem of the highest interest in celestial mechanics may be fully investigated.

MIRA CETI.—This variable star is now close upon the epoch of minimum, as calculated from Argelander's formula of sines, and observations so far are much fewer in number near this part of the light-curve than about the maximum. The gradual ascent to the next maximum may be favourably watched in the present year; the date by the formula is November 10, 1877.

D'ARREST'S COMET.—By M. Coggia's observation at Marseilles on the morning of the 10th inst., it appears that M. Leveau's ephemeris gives the position of the comet within about 3'. Subjoined are the calculated places for Paris noon, during the next period of absence of moonlight :—

	Right Ascension. h. m. s.	North Polar Distance. ° ′	Distance from the Earth.
August 8 ...	3 57 35 ...	83 45·0 ...	1·559
,, 10 ...	4 1 12 ...	83 53·2 ...	1·555
,, 12 ...	4 4 43 ...	84 2·0 ...	1·551
,, 14 ...	4 8 7 ...	84 11·4 ...	1·547
,, 16 ...	4 11 24 ...	84 21·4 ...	1·543
,, 18 ...	4 14 35 ...	84 32·0 ...	1·538
,, 20 ...	4 17 38 ...	84 43·2 ...	1·533
,, 22 ...	4 20 34 ...	84 54·9 ...	1·529

This comet has not yet been observed under its most favourable situation with respect to the earth. When the perihelion passage occurs early in August, it may approach our globe within 0·3 of the earth's mean distance from the sun, but, so far, has not been seen within a distance of about 0·8. At the next return at the beginning of 1884, observations will probably be difficult, but in 1890, when the perihelion passage (as well as can be foreseen without the calculation of planetary perturbations) is likely to fall in the latter part of August or in September, the comet's track in the heavens will be a favourable one.

NOTES

THE annual meeting of the Institution of Mechanical Engineers opened on Tuesday at Bristol. Mr. T. Hawksley, C.E., in his opening address, said it was the duty of the government to adopt such timely measures as would secure to us the paths of the ocean for our food inwards and our manufactures outwards. He deprecated the building of enormous and unwieldy floating castles, and advocated the construction of a fleet of swift, light, well-engined ships, equally capable of sailing or steaming. He thought the extreme action of some of the working classes the cause of England's trades going abroad. There was a conversazione in the evening.

A REMARKABLE case relating to manufacture and transport of explosives has just been the subject of an inquiry before the Wreck Commissioner. The facts are briefly these :—The passenger sailing ship *Great Queensland* left London for Melbourne on the 5th of August last. After the 12th, when she was spoken at sea, she was never seen; but some wreckage from her was washed ashore the same month on the south coast of England. She had taken on board some thirty-four tons of gunpowder, including two tons of the "Patent Safety Blasting Powder" (a compound made in North Wales by treating wood pulp with acid, and stated to have five times the strength of ordinary gunpowder !). There was also a large quantity of detonators and percussion caps. The stowage seems not to have been up to the mark; still the Commissioner regards it as having been fairly safe, but for the danger of spontaneous ignition of the patent powder, to which the facts apparently point as the probable cause of the disaster. The evidence bearing on the manufacture of the compound is not a little surprising. In 1875, the manager in charge of the process was a Mr. Hunt, describing himself as "an engineer, but no chemist." The powder he turned out seems to have been dangerously impure, and some of it having come into the hands of a Government Inspector was found so bad that a regular visit was made to the Company's works. Eight samples were analysed and pronounced impure and dangerous. Mr. Hunt was displaced. His successor, a Mr. Thistleton, made an attempt, at the directors' request, to re-dip the powder left by Mr. Hunt; but the smoke became intolerable, and at 110 deg. the sides smouldered into fire and dirtied everything about, while the heat broke the windows and charred the woodwork. He accordingly suggested that the only way was to dip it in potash solution. The process of remaking was going on in the early months of last year, and it was a portion of this remade impure powder of Mr. Hunt which was shipped on the *Great Queensland*. A few days after she sailed news came of an explosion at the Patent Gunpowder Works, and Major Majendie, having examined a cartridge found on the works after this, wrote that "accident is hardly the term to apply" to what happened. The conclusion of the Wreck Commissioner, then, is that the same event happened at sea and caused the disappearance of the ship. The facts speak for themselves. The case is evidently one of gross mismanagement based on an ignorance which might be laughable, though not excusable, in people employed in mixing tea and coffee, but shameful in the direction of a company for making an explosive. Considering the scientific knowledge imperative in making and handling our modern explosives, the appointment of the one manager who was "no chemist," and of the other who was so good a chemist (from the Royal Polytechnic) as to proceed to *re-dip* Hunt's material *in order to make it stronger*, at the request of his directors, and was only warned off when this compound nearly blew him into the air, calls loudly for explanation. It is important that the whole responsibility involved in this disgraceful case be fully elucidated by further inquiry.

WE regret to announce the death of Prof. Adolph Erman, the well-known physicist, which occurred in Berlin, July 13th. He was born in Berlin, 1806, and after completing a broad range of scientific study, devoted himself to physics, following in the path of his father, who was then professor of that branch in the Berlin University. In 1828 he joined the Norwegian expedition sent out to Siberia to investigate the phenomena of terrestrial magnetism. His own researches were carried out far beyond the confined limits of the expedition, and after thoroughly examining the hitherto almost unknown volcanoes of Kamtschatka, he terminated his journey by completing the circuit of the world in a Russian frigate. The rich store of magnetic observations made during the entire tour were gathered together into a work of two volumes. In 1834 Erman was appointed Professor of Physics at Berlin, a post which he continued to occupy up to the time of his death. From 1841–1866, he edited the *Archiv für wissen-*